UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA NEW ENGLAND
ONE CONGRESS STREET
BOSTON, MASSACHUSETTS 02114

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: **MA0100722**

NAME AND ADDRESS OF APPLICANT:

Town of Northbridge
Department of Public Works
7 Main Street
Whitinsville, MA 01588

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Northbridge Wastewater Treatment Plant
644 Providence Road
Whitinsville, MA 01588

RECEIVING WATERS: **Unnamed tributary to the Blackstone River** (Blackstone River Basin)
(USGS Code #01090003)

CLASSIFICATION: **Class B - warm water fishery**

I. Proposed Action, Type of Facility, and Discharge Location.

The above named applicant has applied to the U.S. Environmental Protection Agency ("EPA") for the reissuance of its NPDES permit to discharge into the designated receiving water. The facility is engaged in the collection and treatment of domestic wastewater. The discharge from this advanced secondary wastewater treatment facility is via Outfall 001 to an unnamed tributary to the Blackstone River.

II. Description of Treatment System and Discharges

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on Table 1. Figure 1 shows the facility location.

The Northbridge WTP operates a 2.0 million gallon per day (MGD) advanced secondary wastewater treatment facility and serves a population of about 10,000. There is currently one industrial user, Riverdale Mills, which discharges to the WTP and no Combined Sewer Overflows (CSOs).

The EPA filed an Administrative Order with the Town of Northbridge on January 2, 1998. This (AO) resulted from ongoing permit violations and required a major upgrade of the facility to be undertaken, including the installation of an ultraviolet (UV) disinfection system and the design and construction of advanced wastewater treatment. Interim effluent limits were put in place through December 2003. In 2003, the Town completed the construction of a sequencing batch reactor (SBR) type treatment system, replacing the old, trickling filter style treatment system. See Figure 2 for a schematic of this new treatment system.

The Northbridge WTP utilizes a comminutor to shred any coarse sewage solids and other materials. The influent water then passes through a gravel trap. Influent composite sampling occurs at this point for applicable parameters. The influent then passes through a bar screen, which is manually cleaned. Flows are then pumped to two rectangular primary clarifiers which settle out sludge and remove floating scum. See sludge information later. Flows from these clarifiers are then pumped to the SBRs, where a batch process is used to remove BOD, TSS and nitrogen loadings. Flow is then sent to another tank to settle the activated sludge or biomass. The supernatant from this tank is then sent by gravity to the equalization tank. If there is a facility upset of some kind at this point, the permittee has the option of pumping the SBR effluent to the on-site sand bed distribution box for final settling. Normally, this bypass line is closed and all decanted SBR effluent is pumped to the equalization tank. From here, the treated wastewater flows to the UV system for disinfection. Flow at this point is measured by a magnetic flow meter. A flow control valve is used to assure that there is sufficient detention time for the effluent that passes through the UV system. The treated effluent is then discharged to an unnamed tributary, which flows through a wetland area and eventually to the Blackstone River.

III. Permit Basis and Explanation of Effluent Limitation Derivation

Technology-Based Requirements

Under Section 301(b)(1)(B) of the CWA, POTWs must have achieved effluent limitations based upon **secondary treatment** by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133, and include biochemical oxygen demand (BOD) and total suspended solids (TSS) monthly average and weekly average limits of 30 mg/l and 45 mg/l respectively, a monthly average limit of 85 percent removal for BOD and TSS, and pH limits of 6- 9 standard units (SU). In the absence of published technology-based effluent guidelines, the permit writer is authorized under

Section 402(a)(1) of the CWA to establish effluent limitations on a case-by-case basis using best professional judgement (BPJ). See 40 CFR §§125.3 (c)(2) and (c)(3).

Water Quality-Based Requirements

Under Section 301(b)(1)(C) of the CWA and EPA regulations NPDES permits must contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve state or federal water quality standards or other applicable requirements of State law.

Water quality standards consist of three parts: (1) beneficial designated uses for a water-body or a segment of a water-body; (2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts Surface Water Quality Standards, found at 314 CMR 4.00, include these elements. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has the "reasonable potential" to cause or contribute to an excursion above any water quality standard. An excursion occurs if, for example, the projected or actual in-stream concentration exceeds an applicable water quality criterion. In determining "reasonable potential", EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's reissuance application, monthly discharge monitoring reports (DMRs), and State and Federal Water Quality Reports; (3) sensitivity of the indicator species used in toxicity testing; (4) known water quality impacts of processes on waste waters; and (5) where appropriate, dilution of the effluent in the receiving water.

Antibacksliding

A permit may not be renewed, reissued or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirements of the CWA [see Sections 402(o) and 303(d)(4) of the CWA and 40 CFR §122.44(l)(1 and 2)]. EPA's antibacksliding provisions prohibit the relaxation of permit limits, standards, and conditions except under certain circumstances. Effluent limits based on BPJ, water quality, and state certification requirements must also meet the antibacksliding provisions found at Section 402(o) and 303(d)(4) of the CWA. In this permit, there have been limits that have been revised slightly upward, or less stringent, for total copper, total zinc and chronic NOEC. These adjustments are based on new information, as there has been a revised 7Q10 calculation used to calculated these permit limits.

The total residual chlorine (TRC) limits have also been removed from this permit, because the permittee has installed an ultraviolet (UV) disinfection system for disinfection and no longer uses sodium hypochlorite for this purpose.

Antidegradation

Federal regulations found at 40 CFR Section 131.12 require states to develop and adopt a statewide antidegradation policy which maintains and protects existing instream water uses and the level of water quality necessary to protect the existing uses, and maintains the quality of waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water. The Massachusetts Antidegradation Policy is found at Title 314 CMR 4.04. This draft permit is being reissued with allowable discharge limits as stringent or more stringent than the current permit.

Waterbody Classification and Usage

The unnamed tributary at the point of discharge is classified as a Class B waterbody by the Massachusetts Department of Environmental Protection (MA DEP). Class B waters shall be of such quality that they are suitable for the designated uses of protection and propagation of fish, other aquatic life and wildlife; and for primary and secondary contact recreation. The segment of the Blackstone River that the Town discharges to, designated by the State as Segment MA51-05, is on the Massachusetts DEP's 2002 303(d) list of impaired waters for metals, nutrients, pathogens, suspended solids and turbidity.

Conventional Pollutants

Under Section 301(b)(1)(B) of the CWA, POTWs must have achieved effluent limitations based upon **secondary treatment** by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133. For the period of November through May, effluent limitations for monthly and weekly average Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) are based on requirements under Section 301(b)(1)(B) of the Clean Water Act (CWA) and 40 CFR 133.102. Limitations for Fecal coliform bacteria as well as the range in pH are based upon State Certification requirements for Publicly Owned Treatment Works (POTW) under Section 401(d) of the CWA, 40 CFR 124.53 and 124.55, and water quality standards.

Outfall 001 has discharged in the range of 0.6 - 1.9 MGD to a tributary to the Blackstone River during the period of January 2003 to January 2005. This time period was also used below in discussion of historical parameter values.

Waste Load Allocation

There was a waste load allocation (WLA) performed for the Blackstone River which was completed in November of 1997 on some of the limits in the 1999 permit were based. WLAs are required by Section 303(d) of the Clean Water Act (CWA) and their purpose is to establish effluent discharge

limits for all point sources in a given watershed that will ensure compliance with water quality standards. This WLA was based on a dissolved oxygen (DO) model developed by the University of Rhode Island and funded by the EPA, the Massachusetts Department of Environmental Protection (MADEP) and the Rhode Island Department of Environmental Management (RIDEM). This WLA used low flow, dry weather ambient and discharge data collected in July and August of 1991. The WLA established limits that were necessary to achieve the minimum dissolved oxygen criteria of 5.0 mg/l for the Blackstone River. The WLA utilized a mathematical water quality simulation model (QUAL2E) which was calibrated and verified using water quality survey data collected in 1991. The water quality data and modeling report can be found in the Blackstone River Initiative document dated February 1998. Modeling results formed the basis for limits on BOD, CBOD, TSS, phosphorus and ammonia nitrogen.

The year round BOD and TSS draft permit limits of 10 mg/l monthly and weekly average which were previously based on water quality considerations, have been maintained. There have been thirteen violations of BOD and six violations of TSS during the past two years. The monitoring frequency for BOD and TSS has been changed from one per week to three per week, which is more typical frequency for facilities of this capacity.

The BOD and TSS removal percentages have both averaged over 96% with only one violation of the 85% or better requirement for BOD removal in the past two years.

Nutrients

Nutrients, such as phosphorus and nitrogen, are necessary for the growth of aquatic plants and animals to support a healthy ecosystem. In excess, however, nutrients can contribute to fish disease, brown tide, algae blooms and low dissolved oxygen (DO). Excessive nutrients, generally phosphorus in freshwater and nitrogen in salt water, stimulate the growth of algae, which could start a chain of events detrimental to the health of the aquatic ecosystem. The algae prevent sunlight from penetrating through the water column. As the algae decay, they depress the DO levels in the water. Fish are in turn deprived of oxygen. Excessive algae may also cause foul smells and decreased aesthetic value, which could affect swimming and recreational uses.

It has been documented that the Providence and Seekonk Rivers (in Rhode Island) are impacted by low DO levels and high phytoplankton concentrations that stem from excessive nitrogen loadings. Significant areas of these rivers suffer from hypoxic (low DO) and anoxic (no DO) conditions and violate water quality Federal and State (Rhode Island) water quality standards.

In its Section 305(b) report, the State of RI assessed the health of its receiving waters. Significant nutrient impairments to shellfish harvesting and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters.

The State of Rhode Island conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that

WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line. Since it has been demonstrated that a significant portion of the overall nitrogen loading that discharges to Narragansett Bay originates from WWTF effluents in Massachusetts, we believe that limits on total nitrogen must be considered at the Massachusetts WWTFs to protect the downstream uses in Rhode Island.
According to 40 CFR 122.44(d)(4)), EPA should include any requirements in permits to "conform to applicable water quality requirements under Section 401(a)(2) of the CWA when the discharge affects a State other than the certifying State. Based on monitoring conducted in the Blackstone River in support of the State of Rhode Island's assessment efforts, it was found that the nitrogen input from the Northbridge WTP to the main stem of the Blackstone River was negligible. Therefore, since there appears to be an insignificant nitrogen loading to the Blackstone River (and eventually to Upper Narragansett Bay) from this facility, EPA does not believe that nitrogen limits are appropriate at this time. However, monitoring for nitrate and nitrite nitrogen and total Kjeldahl nitrogen will be continued in this permit.

Phosphorus

These current effluent phosphorus limit of 1.0 mg/l as a monthly average between April and October was established in the 1999 permit and was based on recommendations from the wasteload allocation (WLA) mentioned earlier. This limit was based on meeting the minimum dissolved oxygen criteria but it is insufficient to control cultural eutrophication. During the past 2 years, the permittee has had 10 violations of its seasonal phosphorus limit and has averaged 1.4 mg/l during this seasonal period.

The Massachusetts Surface Water Quality Standards (MA SWQS) at 314 CMR § 4.00 do not contain numerical criteria for total phosphorus. The criteria for nutrients are found at 314 CMR § 4.04(5), as part of the state's antidegradation provisions. This section requires that "any existing point source discharge containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients". MADEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment (HBPT) for POTWs.

There are several applicable water quality criteria which are not being met in the Blackstone River due to phosphorus discharges and resulting eutrophication. They include numeric water quality criteria (e.g., dissolved oxygen), and narrative water quality criteria including aesthetics (314 C.M.R. § 4.05(5)(a)), bottom pollutants and alterations (314 C.M.R. § 4.05(5)(b)), and nutrients 314 C.M.R. § 4.05(5)(c)).

EPA has released "Ecoregional Nutrient Criteria", which were established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters in that ecoregion minimally impacted by human activities, and thus representative of water without cultural eutrophication. Northbridge, MA is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this ecoregion, found in Ambient Water Quality Criteria Recommendations, Information Supporting the

Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV, published in December, 2000 is 24 ug/l (0.024 mg/l). Limits based on the State's HBPT limit and EPA's ecoregion criteria are not being established at this time.

EPA has produced several other guidance documents which contain recommended total phosphorus criteria for receiving waters. The EPA Quality Criteria of Water, 1986 (Gold Book) recommends in-stream phosphorus concentrations of 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir. In the case of this facility, the 0.1 mg/l target is the one suggested by this criterion.

It has been documented that most reaches of the Blackstone River suffer from eutrophication, a condition caused primarily by excessive nutrients entering the river. Phosphorus and other nutrients promote the growth of nuisance algae and aquatic plants. When these plants and algae undergo their decay processes, they generate strong odors, result in lower dissolved oxygen levels in the river, and impair the benthic habitat. This phosphorus-driven eutrophication of the Blackstone River prevents attainment of the designated uses as defined in the MASWQS. These uses include habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Although some phosphorus is introduced into the river from storm water runoff, the majority of phosphorus entering the river is from the POTWs discharging to the Blackstone River, including this facility as well as the Upper Blackstone Water Pollution Abatement District (UBWPAD), the Grafton WWTP and the Uxbridge WWTP.

According to the "Massachusetts Year 2002 Integrated List of Waters (MA DEP)", this segment of the Blackstone River has "abundant instream vegetation consisting of dense beds of rooted submergents (*Sagitaria subulata*) and the streaming green alga *Ulothrix zonata*. In sampling conducted by the MADEP in 2004, upstream values for total phosphorus in Northbridge ranged from 0.13 to 0.69 mg/l and downstream values for total phosphorus in Millville and Blackstone ranged from 0.11 to 0.37 mg/l. These levels are consistently higher than guidance numbers mentioned earlier and EPA believes that these levels encourage continued eutrophication and will therefore continue to result in impairments in the Blackstone River. EPA believes that more stringent total phosphorus limits are necessary to satisfy the MADEP's SWQS relative to eutrophication.

In March 2004, the U.S. Army Corps of Engineers published a draft report entitled "Dry Weather Water Quality Sampling and Modeling Blackstone River Feasibility Study". Figure 28 of this report displays chlorophyll *a* levels in the Blackstone River from 1991 and 2001 assessment efforts. In August of both years, chlorophyll *a* concentrations peaked at between 17 and 19 mg/l just downstream from the Northbridge discharge. These levels are conducive to algal growth and are another factor which could accelerate eutrophication in the river.

EPA and MADEP have concluded that the technology-based requirement of "highest and best practical treatment," which the state has determined to be "0.2 mg/l", is appropriate at this time for this Permittee to address the ongoing impairments in the Blackstone River due primarily to phosphorus and since there is very little dilution available to this discharge in the unnamed tributary.

Thus, EPA has established a 0.2 mg/l effluent phosphorus limit for this facility, based on the State's HBPT standard.

In addition to the seasonal total phosphorus limit of 0.2 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l and an ortho-phosphorus monitoring requirement during November through March. These requirements are necessary to ensure that the higher levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the sediments. EPA expects the vast majority of the phosphorus discharged during this period would be in the form of ortho-phosphorus, or dissolved fraction of phosphorus. The dissolved fraction of phosphorus is believed to pass through the system given the lack of plant growth during the winter period, whereas the particulate phosphorus, or the fraction which is remaining after subtracting out the dissolved fraction from the total phosphorus concentration, would tend to stay in the system and be taken up when water temperatures warm up in the spring.

Ammonia Nitrogen and Dissolved Oxygen

The 1999 permit's ammonia nitrogen limits were based on the WLA and modeling efforts discussed earlier. The dissolved oxygen based limits for the May to October period will also ensure compliance with the applicable instream total ammonia criteria for protection of aquatic from chronic toxicity. The applicable total instream ammonia criteria for this period is 3.0 mg N/l at a pH of 7.0. For May to October, the monthly average limit was established at 2.0 mg N/l to ensure that DO criteria are met in the small tributary. We continue to believe that a 3.0 mg/l limit will not be protective of the DO criteria and thus we are maintaining the limit of 2.0 mg/l for this period. The weekly average limit was set at twice the monthly average, or 4 mg/l, to be protective of acute effects. For this time period over the last 2 calendar years, the permittee has had four (4) violations of the permit limits, with an average of 1.9 mg/l and a high value of 9.9 mg/l.

The November to April limits of 9 mg/l for a monthly average and 18 mg/l for a weekly average are based on DO and toxicity concerns. The WLA predicted that these limits would result in a slight dissolved oxygen criteria violation during the month of April but utilized an instream flow that didn't fully reflect the high seasonal flows that consistently occur in April. The instream ammonia criteria is based on a factor of 3 times the summer criteria of 3 mg/l reflecting the absence of the early life stages of the most sensitive species during this period. The criteria adjustment is based on the 1998 Update of Ambient Water Quality Criteria for Ammonia published by USEPA. For this time period over the last 2 calendar years, the permittee has had two (2) violations of the permit limits, with an average of 4.2 mg/l and a high value of 17.1 mg/l.

The minimum DO requirement of 5.0 mg/l has been maintained in this permit with weekly monitoring, consistent with the State WQS for Class B waters.

Bacteria Limitations

To reflect the seasonal period of chlorination, the current permit included bacteria limits for the period between April 1st and October 31st to ensure that the water quality standards are met

instream. The Fecal Coliform limits of 200 colony forming units (cfu) per 100ml and 400 cfu per 100 ml are consistent with Class B water requirements of the MA DEP. The previous weekly average limit of 400 cfu/ml has been removed since it is not a State Certification requirement and is believed to be redundant. Instead, the monitoring frequency has been increased from 2 per week to 3 per week, which is more typical of the monitoring frequency for facilities of this capacity. There has been one violation in the past two years and a monthly average of 38 cfu per100 ml and a high reading of 602.

Total Residual Chlorine

The 1999 permit established permit limits for TRC due to the chlorination occurring at the plant for bacterial control. In 2003, the Town installed an ultraviolet (UV) disinfection system and no longer uses any chlorine compound for bacterial control. Small amounts of sodium hypochlorite are still used for odor control in the sludge gravity thickeners, but these levels are not believed to result in any detectable levels in the effluent.

Change in dilution factor

To calculate certain permit limits, the 7Q10 flow is required, which represents the statistical 7 day low flow over a 10 year period. The existing permit limits are based on the previously calculated dilution factor of 1.14. In a letter of February 19, 1999, the permittee's consultant, Camp Dresser and McKee, submitted documentation disputing EPA's calculation of the previous dilution factor of 1.14, which was used in the Town's1992 permit. The consultant believes that a drainage area of 1.42 square miles should be used in the 7Q10 calculation instead of the previously used value of 1.09 square miles. EPA agrees with this calculation and has based the following metals limits and chronic NOEC limit on this revised 7Q10 dilution. The revised flow dilution is 1.2:1. See **Attachment B** which has recalculated the metals limits and the chronic NOEC limit based on this revised flow dilution.

Metals

The 1999 permit established effluent limits for total zinc, total copper and total lead, because it was determined that there was a reasonable potential to violate the instream water quality standards for these metals. For the calendar years of 2003 and 2004, there were 44 permit violations for total copper and 25 violations for total zinc. Total lead was often not detected in the effluent, with two violations in the period. However, it is not clear that the most sensitive testing method for lead was used in these analyses. Therefore, this permit requires the permittee to use a specific testing method for lead which has a method detection level of 3 ug/l. In other words, this method is believed to reliably detect lead down to this level, so this will be the level that compliance will be judged against, even though it is slightly higher than the permit limit. The maximum daily limit for lead has been removed and replaced with a reporting requirement, since we do not believe that there is a reasonable potential to violate the calculated limit of 46 ug/l based on past effluent data. Although the limits for total lead and zinc have been adjusted slightly upward as mentioned earlier based on the revised 7Q10 value, the total copper limits have been slightly reduced, or made more stringent,

because the factors used to calculate these limits have been changed. The factors involved in these calculations may be found in " National Recommended Water Quality Criteria, December 10, 1998, FR Vol. 63, No.237". See **Attachment B** for these calculations.

Whole Effluent Toxicity

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The Region's current policy is to include toxicity testing requirements in all municipal permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic and industrial contributions, the low level of dilution at the discharge location, water quality standards, and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's Technical Support Document for Water Quality-Based Toxics Control). EPA Region I has developed a toxicity control policy. The policy requires wastewater treatment facilities to perform toxicity bioassays on their effluents. The Commonwealth of MA DEP requires bioassay toxicity testing for state certification.

Pursuant to EPA Region 1 policy, discharges having a dilution ratio of between 20:1 and 100:1 are required to perform acute toxicity testing. The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

Quarterly WET testing has been conducted during the past five years. The results of the past two years have consistently shown an LC50 of 100%. The C-NOEC is the highest effluent concentration at which No Observed Chronic Effect (e.g. growth, reproduction, mortality) will occur at continuous exposure to test organisms in a life-cycle or partial life-cycle test. Over the past 2 years, the NOEC values have often been at 100%, with a few values below this and one violation of the 88% or greater limit for the fathead minnow. The revised C-NOEC limit of "83% or greater" is defined as a sample which is composed of 83% (or greater) effluent, the remainder being dilution water. This is a maximum daily limit based on the inverse of the dilution factor of 1.2. The draft permit requires that the company continue to conduct WET testing for Outfall 001 effluent four times per year and that each test include the use of the fathead minnow, Pimephales promelas, only, in accordance with EPA Region I protocol found in Attachment A. This specie was found to be the more sensitive of the two species used in previous WET testing.

Inflow and Infiltration

The draft permit contains detailed requirements for the permittee to eliminate excessive infiltration and inflow ("I/I") to its sewer system. These measures are appropriate because the reduction of I/I can abate sanitary sewer overflows ("SSOs"), as well as prevent violations of permit requirements at the facility. EPA expects MADEP to require the I/I conditions as a condition for obtaining State certification.

IV. Sewage Sludge Information and Requirements

The Northbridge WTP generates about 284 dry metric tons per year. Sludge from the treatment system is sent through two (2) gravity thickeners and this sludge is trucked to the Synagro facility in Woonsocket, Rhode Island for incineration and disposal. This is sent to the disposal site three days per week at about 9000 gallons per delivery.

In February 1993, the Environmental Protection Agency (EPA) promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of §405(d) of the Clean Water Act (CWA). Section §405(f) of the CWA requires that these regulations be implemented through permits. This permit is intended to implement the requirements set forth in the technical standards for the use and disposal of sewage sludge, commonly referred to as the Part 503 regulations.

Section 405(d) of the CWA requires that sludge conditions be included in all municipal permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's proposed Standards for the Disposal of Sewage Sludge to be codified at 40 CFR Part 503 (February 19, 1993 - Volume 58, pp 9248 - 9415). These conditions are outlined in the draft permit.

V. State Certification Requirements

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection has reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit will be certified.

VI. Public Comment Period, Public Hearing, and Procedures for Final Decision

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Massachusetts Office of Ecosystem Protection (CIP), 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. Such requests shall state the nature of the issues

proposed to be raised in the hearing. A public hearing may be held if the criteria stated in 40 CFR 124.12 are satisfied. In reaching a final decision on the draft permit the EPA will respond to all significant comments and make these responses available to the public at EPA's Boston office.

Following the close of the comment period, and after any public hearings, if such hearings are held, the EPA will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of the final permit decision, any interested person may submit a request for a petition for review of the permit to EPA's Environmental Appeals Board consistent with 40 CFR 124.19.

VII. EPA and MA DEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays, from the EPA and DEP contacts below:

George Papadopoulos, Massachusetts Office of Ecosystem Protection
One Congress Street Suite 1100 - Mailcode CIP
Boston, MA 02114-2023
Telephone: (617) 918-1579 FAX: (617) 918-1505

Paul Hogan, Massachusetts Department of Environmental Protection
Division of Watershed Management, Surface Water Discharge Permit Program
627 Main Street, 2nd Floor Worcester, Massachusetts 01608
Telephone: (508) 767-2796 FAX: (508) 791-4131

November 7, 2005
Date

Linda M. Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

TABLE 1 - OUTFALL 001 CHARACTERISTICS [1]

Parameter	Monthly Average	High Daily Maximums	Permit Violations
Flow, MGD	Range:	0.6 - 1.9	0
BOD_5 ,mg/l	6.7	25, 26	13
TSS, mg/l	4.1	26, 27	6
pH, standard units	Range:	6.0 - 7.6	19
Fecal Coliform, cfu/100 ml	38	302, 602	1
Total Residual Chlorine, mg/l,	0.17	0.49, 0.77	8
Dissolved Oxygen, mg/l	Range:	4.4 - 9.0	2
Phosphorus, mg/l (Nov - Mar)	2.3	3.1, 3.9	---
Phosphorus, mg/l (Apr - Oct)	1.4	2.3, 3.4	10
Ammonia Nitrogen, mg/l (Nov - Apr)	4.2	12.4, 17.1	2
Ammonia Nitrogen, mg/l (May - Oct)	1.9	8.9, 9.9	6
Ammonia Nitrogen, mg/l (Jun - Oct)	0.20	1.4, 5.7	0
Nitrite + Nitrate Nitrogen, mg/l	Range:	1.1 - 8.6	---
BOD Removal, %	96.5	83.5, 91.3[2]	1
TSS Removal, %	96.6	91.6, 92[2]	0
Copper, Total, ug/l	25	53, 110	44
Lead, Total, ug/l	ND[3]	2	1
Zinc, Total, ug/l	107	200, 600	25

Parameter	Monthly Average	High Daily Maximums	Permit Violations

LC50, daphnid,%	100	100[2]	0
LC50, minnow,%	100	100[2]	0
NOEC, daphnid,%	98.5	88[2]	0
NOEC, minnow,%	86	6.25, 88[2]	1

1. Data is from Discharge Monitoring Reports for the period of January 2003 to January 2005.
2. These are the low values for the period.
3. Not detected

ATTACHMENT B

METALS and C-NOEC LIMITS CALCULATIONS

Parameters: Copper, Zinc and Lead

Water Quality Criteria: Hardness dependent; Equation: $e^{(X [\ln(h)] + Y)}$

Where X and Y are chronic and acute coefficients for dissolved fractions of metals[1]

	Copper		Zinc		Lead	
	Chronic	Acute	Chronic	Acute	Chronic	Acute
Where: X =	0.8545	0.9422	0.8473	0.8473	1.273	1..273
Y =	- 1.702	- 1.70	0.884	0.884	-4.705	- 1.46

h = Hardness = 50 mg/l as $CaCO_3$ [2] ; ln = natural logarithm

Thus; $e^{(.8545 [(\ln 50)] - 1.702)}$ $e^{(.9422 [\ln(50)] - 1.70)}$ $e^{(1.273 [\ln(50)] - 4.705)}$ $e^{(1.273 [\ln(50)] - 1.46)}$

$e^{(0.8473 [\ln(50)] + 0.884)}$ $e^{(0.8473 [\ln(50)] + 0.884)}$

Copper	Zinc	Lead
5.2 ug/l ; 7.3 ug/l	67 ug/l ; 67 ug/l	1.3 ug/l ; 34 ug/l

To establish limits, these criteria values must be multiplied by the dilution factor and then a conversion factor must be used to attain the total metal value:

Flow Dilution @ Design Flow: $\frac{2.0 \text{ MGD} + 0.36 \text{ MGD}}{2.0 \text{ MGD}} = 1.2$

1. National Recommended Water Quality Criteria, December 10, 1998, FR Vol. 63, No.237.

2. This is a representative value of the effluent from the WET testing results over the last 2 years, which is appropriate to use since the effluent often comprises the majority of this tributary.

Effluent Limitations:

Copper		Zinc	
Chronic	Acute	Chronic	Acute
1.2 (5.2 ug/l)/0.96	1.2 (7.3 ug/l)/0.96	1.2 (67 ug/l)/0.978	1.2 (67 ug/l)/0.986
6.5 ug/l	**9.1 ug/l**	**82 ug/l**	**82 ug/l**

The conversion factors of 0.96 and 0.978 are used to convert from the dissolved metal criteria limit to obtain the total metal limit. The chronic value corresponds to a monthly average limit and the acute to a daily maximum limit.

For lead, there is a different formula required to convert from the dissolved metal to the total metal as follows:

Lead

Chronic	Acute
1.2 (1.3 ug/l) = **1.6 ug/l**	1.2 (34 ug/l) = **41 ug/l**

Chronic limit : 1.6 ug/l (1.46203- [ln(50)(0.145712)] = 1.6/0.89 = **1.8 ug/l**

Acute limit: 41 ug/l (1.46203- [ln(50)(0.145712)] = 41/0.89 = **46 ug/l**

C-NOEC Limit Calculation

The C-NOEC limit is equal to the receiving water concentration, which is the inverse of the dilution factor:

1 / 1.2 = **83 %**